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Dynamic heterogeneity of a colloidal solution near the sol-gel transition

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Abstract

The results of the simulation of the dynamics of particles in a colloidal solution in the vicinity of the sol-gel transition are presented. The Van Hove correlation function, incoherent scattering function, and mean-square displacement of particles at different temperatures and volume densities have been calculated from the simulation data. The effects of dynamic heterogeneity have been evaluated numerically and the gelation temperature at different volume densities has been determined using the non-Gaussian parameter. It has been shown that the specific features observed in the dynamics of particles in the colloidal solution near the sol-gel transition are explained by the conventional separation of the particles in the system into fast particles, which contribute to translational diffusion, and slow particles, which participate predominantly in vibrational processes. © 2011 Pleiades Publishing, Ltd.

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